IN THE CLAIMS:

Please amend the claims as shown below. The claims, as currently pending in the application read as follows:

1. (Currently Amended) A gray level reproduction method which makes one-to-one correspondence between each pixel of an original image and each element of a threshold matrix, and represents a density of each pixel in an output image by binary or multivalue, wherein a dot pattern of which the size corresponds to said threshold matrix is divided into interspersed blocks of at least first and second groups of blocks and wherein said threshold matrix is created according to following conditions:

(1) ~~when a dot pattern of which the size corresponds to the threshold matrix is divided into small blocks, the number of dots in each of all the blocks is made equal in~~ for each gray level of all gray levels, the number of dots in the dot pattern of the output image is equal in each of all the blocks;

(2) for each gray level of ~~the dot patterns in the plural blocks are made mutually the same in~~ all the gray levels, the dot pattern of the output image is mutually the same in each block of the first group of blocks; ~~and~~

(3) ~~at a boundary of the blocks where the dot patterns are made mutually the same, the dots are increased while taking conformity of the dot patterns~~ for each gray level of all gray levels, the dot pattern of the output image is mutually different for at least some blocks of the second group of blocks; and

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(4) for increasing gray levels, the number of dots in the dot pattern of the output image is increased while substantially maintaining conformity of the dot patterns at a boundary corresponding to a boundary of the threshold matrix.

2. (Currently Amended) A method according to Claim 1, wherein the ~~sum of~~ dot pattern is determined based on an averaged repulsion potentials ~~is used to take the conformity of the dot patterns~~.

3. (Currently Amended) A method according to Claim 1 or 2, wherein said threshold matrix is created by controlling an order of dot increase between ~~the~~ blocks of the first group ~~where the dot patterns are made mutually the same~~ and ~~the other~~ blocks of the second group.

4. (Currently Amended) A method according to Claim 3, wherein the blocks ~~where the dot patterns are made mutually the same~~ of the first group are preferential as the order of dot increase.

5. (Currently Amended) A method according to Claim 1, wherein, ~~when a~~ distance between dots in the dot pattern is controlled based on an averaged ~~determined, a~~ repulsion potential ~~is assigned to each dot to control a distance between the dots~~.

6. (Currently Amended) A method according to Claim 1, wherein, ~~in a case where the dot pattern is determined,~~ when ~~the~~ a block is further divided into four smaller blocks, the number of dots in an output image in each of all the smaller blocks is made equal in each of all of 4n gray levels (n is an integer).

7. (Currently Amended) A method according to Claim 1, wherein, when the threshold matrix is repeatedly used two dimensionally and periodically, a repeat direction is ~~being~~ diverted to either a longitudinal direction or a lateral direction.

8. (Original) A method according to Claim 1, wherein a shape of the threshold matrix is different from a square.

9. (Original) A method according to Claim 1, wherein a color image is decomposed into plural color components, and the original image of at least one color component is input as an input image.

10. (Currently Amended) A gray level reproduction method which makes one-to-one correspondence between each pixel of an original image and each element of a threshold matrix, and represents a density of each pixel in an output image by binary or multivalue, wherein a dot pattern of which the size corresponds to said threshold matrix is divided into interspersed blocks of at least first and second groups of blocks and wherein said threshold matrix is created according to following conditions:

(1) ~~when a dot pattern of which the size corresponds to the threshold matrix is divided into small blocks, the number of dots in each of all the blocks is made equal in~~ for each gray level of all gray levels, the number of dots in the dot pattern of the output image is equal in each of all the blocks;

(2) ~~the dot patterns in the plural blocks are made mutually the same in~~ for each gray level of all the gray levels, the dot pattern of the output image is mutually the same in each block of the first group of blocks; ~~and~~

(3) for each gray level of all gray levels, the dot patterns of the output image is mutually different for at least some blocks of the second group of blocks; and

(4) for increasing gray levels, an order of dot increase in the dot pattern of the output image is controlled between the blocks ~~where the dot patterns are made mutually the same and the other blocks~~ of the first group and the blocks of the second group.

11. (Currently Amended) A method according to Claim 10, wherein the blocks ~~where the dot patterns are made mutually the same~~ of the first group are preferential as the order of dot increase.

12. (Currently Amended) A method according to Claim 10, wherein~~, when~~ the dot pattern is determined~~, a~~ based on an averaged repulsion potential ~~is assigned to each dot to control a distance between the dots~~.

13. (Currently Amended) A method according to Claim 10, wherein, in a case where the dot pattern is determined, when the a block is further divided into four smaller blocks, the number of dots in an output image in each of all the smaller blocks is made equal in each of all of 4n gray levels (n is an integer).

14. (Currently Amended) A method according to Claim 10, wherein, when the threshold matrix is repeatedly used two-dimensionally and periodically, a repeat direction is being diverted to either a longitudinal direction or a lateral direction.

15. (Original) A method according to Claim 10, wherein a shape of the threshold matrix is different from a square.

16. (Original) A method according to Claim 10, wherein a color image is decomposed into plural color components, and the original image of at least one color component is input as an input image.

17. (Currently Amended) A gray level reproduction apparatus which makes one-to-one correspondence between each pixel of an original image and each element of a threshold matrix, and represents a density of each pixel in an output image by binary or multivalue, wherein, when a dot pattern of which the size corresponds to said threshold matrix is divided into interspersed blocks of at least first and second groups of blocks and wherein said threshold matrix is created according to the following conditions:

(1) for each gray level of ~~small blocks, the number of dots in each of all the blocks is made~~ ~~equal in~~ all gray levels, the number of dots in the dot pattern of the output image is equal in each of all the blocks, (2) for each gray level of all gray levels, the dot pattern of the output image is ~~and the dot patterns in the plural blocks are made~~ mutually the same in each block of the first group of blocks, (3) for each gray level of all the gray levels, the dot pattern of the output image is mutually different for at least some blocks of the second group of blocks, and (4) for increasing gray levels, the number of dots in the dot pattern of the output image is increased while substantially maintaining conformity of the dot patterns at a boundary corresponding to a boundary of the threshold matrix, said apparatus comprising:

storage means for storing said threshold matrix;

comparison means for comparing as a threshold the value of said threshold matrix with the density of each pixel of the original image for each pixel; and

output means for outputting the binary- or multivalue-processed dot pattern according to the comparison result of said comparison means,~~;~~

~~wherein, at a boundary of the blocks where the dot patterns are made mutually the same, said threshold matrix is created such that the dots are increased while taking conformity of the dot patterns.~~

18. (Currently Amended) An apparatus according to Claim 17, wherein said threshold matrix is created by controlling order of dot increase between the blocks

where the dot patterns are made mutually the same and the other blocks of the first group and the blocks of the second group.

19. (Currently Amended) A gray level reproduction apparatus which makes one-to-one correspondence between each pixel of an original image and each element of a threshold matrix, and represents a density of each pixel in an output image by binary or multivalue, wherein, when a dot pattern of which the size corresponds to said threshold matrix is divided into interspersed small blocks of at least first and second groups of blocks and wherein said threshold matrix is created according to the following conditions: (1) for each gray level of , the number of dots in each of all the blocks is made equal in all gray levels, the number of dots in the dot pattern of the output image is equal in each of all the blocks, (2) for each gray level of and the dot patterns in the plural blocks are made mutually the same in all the gray levels, the dot pattern of the output image is mutually the same in each block of the first group of blocks, (3) for each gray level of all gray levels, the dot pattern of the output image is mutually different for at least some blocks of the second group of blocks, and (4) for increasing gray levels, an order of dot increase in the dot pattern of the output image is controlled between the blocks of the first group and the blocks of the second group, said apparatus comprising:

storage means for storing said threshold matrix;

comparison means for comparing as a threshold the value of said threshold matrix with the density of each pixel of the original image for each pixel; and

output means for outputting the binary- or multivalue-processed dot pattern according to the comparison result of said comparison means.~

wherein said threshold matrix is created by controlling order of dot increase between the blocks where the dot patterns are made mutually the same and the other blocks.

20. (Currently Amended) A threshold matrix which is used to be compared with each pixel of an original image to represent a density of each pixel in an output image by binary or multivalue, wherein a dot pattern of which the size corresponds to said threshold matrix is divided into interspersed blocks of at least first and second groups of blocks, and wherein said threshold matrix is and created according to the following conditions:

(1) when a dot pattern of which the size corresponds to the threshold matrix is divided into small blocks, the number of dots in each of all the blocks is made equal in for each gray level of all gray levels the number of dots in the dot pattern of the output image is equal in each of all the blocks;

(2) the dot patterns in the plural blocks are made mutually the same in for each gray level of all the gray levels, the dot pattern of the output image is mutually the same in each block of the first group of blocks; and

(3) at a boundary of the blocks where the dot patterns are made mutually the same, the dots are increased while taking conformity of the dot patterns for each gray level

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of all gray levels, he dot pattern of the output image is mutually different for at least some blocks of the second group of blocks; and

(4) for increasing gray levels, the number of dots in the dot pattern of the output image is increased while substantially maintaining conformity of the dot patterns at a boundary corresponding to a boundary of the threshold matrix.

21. (Currently Amended) A threshold matrix according to Claim 20, wherein said threshold matrix is created by controlling order of dot increase between the blocks ~~where the dot patterns are made mutually the same and the other blocks~~ of the first group and the blocks of the second group.

22. (Currently Amended) A threshold matrix which is used to be compared with each pixel of an original image to represent a density of each pixel in an output image by binary or multivalue, wherein a dot pattern of which the size corresponds to said threshold matrix is divided into interspersed blocks of at least first and second groups of blocks, and wherein said threshold matrix is ~~and~~ created according to the following conditions:

(1) ~~when a dot pattern of which the size corresponds to the threshold matrix is divided into small blocks, the number of dots in each of all the blocks is made equal in~~ for each gray level of all gray levels, the number of dots in the dot pattern of the output image is equal in each of all the blocks;

(2) ~~the dot patterns in the plural blocks are made mutually the same in~~ <u>for</u>

<u>each gray level of</u> all the gray levels<u>, the dot pattern of the output image is mutually the</u>

<u>same in each block of the first group of blocks</u>; ~~and~~

(3) <u>for each gray level of all gray levels, the dot pattern of the output image</u>

<u>is mutually different for at least some blocks of the second group of blocks; and</u>

<u>(4) for increasing gray levels, an</u> order of dot increase <u>in the dot pattern of</u>

<u>the output image is controlled</u> between the blocks ~~where the dot patterns are made~~

~~mutually the same and the other blocks is controlled~~ <u>of the first group and the blocks of the</u>

<u>second group</u>

23. (Currently Amended) A <u>computer-readable</u> storage medium which

~~computer-readably~~ stores a <u>computer-executable</u> control program to control a gray level

reproduction process which makes one-to-one correspondence between each pixel of an

original image and each element of a threshold matrix and represents a density of each

pixel in an output image by binary or multivalue, wherein, ~~when~~ a dot pattern of which the

size corresponds to said threshold matrix is divided into <u>interspersed blocks of at least first</u>

<u>and second groups of blocks and wherein said threshold matrix is created according to the</u>

<u>following conditions: (1) for each gray level of</u> ~~small blocks, the number of dots in each of~~

~~all the blocks is made equal in~~ all gray levels, ~~and the dot patterns in the plural blocks are~~

~~made~~ <u>the number of dots in the dot pattern of the output image is equal in each of all the</u>

<u>blocks, (2) for each gray level of all gray levels, the dot pattern of the output image</u>

mutually the same in <u>each block of the first group of blocks, (3) for each gray level of all</u>

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the gray levels, the dot pattern of the output image is mutually different for at least some blocks of the second group of blocks, and (4) for increasing gray levels, the number of dots in the dot pattern of the output image is increased while substantially maintaining conformity of the dot patterns at a boundary corresponding to a boundary of the threshold matrix, said ~~storage medium~~ control program comprising:

a comparison step for comparing a threshold value of the threshold matrix ~~which is created, at a boundary of the blocks where the dot patterns are made mutually the same, such that the dots are increased while taking conformity of the dot patterns~~ with the density of each pixel of the original image for each pixel; and

an output step for outputting ~~a module for performing control to compare as a threshold the value of said threshold matrix with the density of each pixel of the original image for each pixel, and output~~ the binary- or multivalue-processed dot pattern according to the comparison result of said comparison step.

24. (Currently Amended) A computer-readable storage medium according to Claim 23, wherein said threshold matrix is created by controlling order of dot increase between the blocks ~~where the dot patterns are made mutually the same and the other blocks~~ of the first group and the blocks of the second group.

25. (Currently Amended) A computer-readable storage medium which ~~computer-readably~~ stores a computer-executable control program to control a gray level reproduction process which makes one-to-one correspondence between each pixel of an

original image and each element of a threshold matrix and represents a density of each

pixel in an output image by binary or multivalue, wherein, ~~when~~ a dot pattern of which the

size corresponds to said threshold matrix is divided into <u>interspersed</u> ~~small~~ blocks <u>of at</u>

<u>least first and second groups of blocks and wherein said threshold matrix is created</u>

<u>according to the following conditions: (1) for each gray level of,</u> ~~the number of dots in each~~

~~of all the blocks is made equal in~~ all gray levels, <u>the number of dots in the dot pattern of</u>

<u>the output image is equal in each of all the blocks, (2) for each gray level of all gray levels,</u>

<u>the dot pattern of the output image is</u> ~~and the dot patterns in the plural blocks are made~~

mutually the same in <u>each block of the first group of blocks, (3) for each gray level of</u> all

the gray levels, <u>the dot pattern of the output image is mutually different for at least some</u>

<u>blocks of the second group of blocks, and (4) for increasing gray levels, and order of dot</u>

<u>increase in the dot pattern of the output image is controlled between the blocks of the first</u>

<u>group and the blocks of the second group,</u> said <u>control program</u> ~~storage medium~~

comprising:

     <u>a comparison step for comparing the threshold value of</u> the threshold

matrix ~~which is created by controlling order of dot increase between the blocks where the~~

~~dot patterns are made mutually the same and the other blocks~~ <u>with the density of each pixel</u>

<u>of the original image for each pixel;</u> and

     <u>an output step for outputting</u> ~~a module for performing control to compare as~~

~~a threshold the value of said threshold matrix with the density of each pixel of the original~~

~~image for each pixel, and output~~ the binary- or multivalue-processed dot pattern according

to the comparison result <u>of said comparison step</u>.